IN THE CLAIMS:

MARKED UP VERSION OF THE AMENDED CLAIMS (Version with marking to show changes made)

1. (previously presented) A process for determining an actual position of a structure of an object to be examined (1) in a coordinate system, wherein a computed tomography (CT) scanner is employed which uses CT technology, having a first coordinate system, the CT coordinate system, related to said CT scanner, and a coordinate measuring instrument (MI) is employed which is either a tactile or an optical coordinate measuring instrument, a multisensor coordinate measuring instrument, or an ultrasonic coordinate measuring instrument, having a second coordinate system, the MI coordinate system, related to said coordinate measuring instrument, wherein

a) coordinates of the object to be examined (1) are determined in the MI coordinate system,

b) a target position of the structure within the object to be examined (1) is predefined,

c) after execution of steps a) and b), the target position is determined in the MI coordinate system,

d) and, using the determination of step c), the object to be examined (1) is positioned in such a way that the target position of the structure comes to lie within a volume detected by the CT scanner,

further characterized in that, by using the CT scanner, a three-dimensional digital CT image of a tolerance volume, including the structure, is created and stored as a CT data record, and the actual position of the structure is determined in the CT coordinate system on the basis of the CT data record.

2. (previously presented) A process for determining an actual position of a structure of an object to be examined (1) in a coordinate system, wherein a CT scanner is employed which uses CT technology, having a first coordinate system, the CT coordinate system, related to said CT scanner, and a coordinate measuring instrument is employed which is either a tactile or an optical coordinate measuring instrument, a multisensor coordinate measuring instrument, or an ultrasonic coordinate measuring instrument, having a second coordinate system, the MI coordinate system, related to said coordinate measuring instrument, wherein

a) coordinates of the object to be examined (1) are determined in the CT coordinate system,

b) a target position of the structure within the object to be examined (1) is

predefined,

c) after execution of steps a) and b), the target position is determined in the CT coordinate system,

d) and, using the determination of step c), the object to be examined (1) is positioned in such a way that the target position of the structure comes to lie within an area that is detectable by the coordinate measuring instrument,

further characterized in that, in addition to the actual position of the structure, a shape of the structure is also determined on the basis of a CT image or a CT data record.

3. (currently amended) The process according to Claim 1, characterized in that, [[when]] <u>when</u> a predefined target position of the structure is relative to at least three selected, non-co-linear points of the object to be examined (1), the object to be examined is positioned using the coordinate measuring instrument in such a way that at least a part of the object to be examined (1) lies within the volume detected by the CT scanner and this part of the object to be examined (1) contains the target position of the structure.

4. (original) The process according to Claim 3, characterized in that,

at a predefined maximum deviation of the target position from the actual position of the structure of the object to be examined (1), said object is positioned using the coordinate measuring instrument in such a way that the target position as well as the actual position of the structure lie within the volume detected by the CT scanner.

5. (previously presented) The process according to Claim 4,

characterized in

that,

the actual position differs from the target position by a predefined tolerance deviation at most, so that the actual position lies within a tolerance volume whose edge is at a distance from the target position by the tolerance deviation at most, and

the object to be examined is positioned using the coordinate measuring instrument in such a way that the tolerance volume lies completely within the volume detected by the CT scanner.

6. (previously presented) The process according to Claim 5, characterized in that the tolerance volume is a sphere, a tolerance sphere, whose mid-point coincides with the

target position and whose radius is predefined by an amount of the maximum deviation of the target position from the actual position of the structure.

7. (previously presented) The process according to Claim 5 or 6, characterized in

that the object to be examined is positioned using the coordinate measuring instrument in such a way that the volume detected by the CT scanner has, at most, an x-fold volume of the tolerance volume, wherein x is a predefinable number that is greater than 1.

8. (currently amended) The process according to Claim 2, characterized in that

when a predefined target position of the structure is relative to at least three selected, non-co-linear points of the object to be examined (1), the object to be examined (1) is positioned using the CT scanner in such a way that at least a part of the object to be examined (1) lies within the area that is detectable by the coordinate measuring instrument and this part of the object to be examined (1) contains the target position of the structure; [[,]]

at a predefined maximum deviation of the target position from the actual position of the structure of the object to be examined (1), said object is

positioned using the CT scanner in such a way that the target position as well as the actual position of the structure lie within the area that is detectable by the coordinate measuring instrument; [[,]]

the actual position differs from the target position by a predefined tolerance deviation at most, so that the actual position lies within a tolerance area whose edge is at a distance from the target position by the tolerance deviation at most; [[,]]

and the object to be examined (1) is positioned using the CT scanner in such a way that the tolerance area lies completely within the area that is detectable by the coordinate measuring instrument.

9. (previously presented) The process according to claim 1 or 2, characterized in that a relative location and a relative orientation of the CT coordinate

system relative to the MI coordinate system are predefined or determinable by means of calibration.

10. (canceled)

11. (canceled)

12. (currently amended)

A process for determining an actual position of a structure of an object to be examined (1) in a coordinate system, wherein a CT scanner is employed which

uses CT technology, having a first coordinate system, the CT coordinate system, related to said CT scanner, and a coordinate measuring instrument is employed which is either a tactile or an optical coordinate measuring instrument, a multisensor coordinate measuring instrument, or an ultrasonic coordinate measuring instrument, having a second coordinate system, the MI coordinate system, related to said coordinate measuring instrument, wherein

a) coordinates of the object to be examined (1) are determined in the CT coordinate system,

b) a target position of the structure within the object to be examined (1) is predefined,

c) after execution of steps a) and b), the target position is determined in the CT coordinate system,

d) and, using the determination of step c), the object to be examined (1) is positioned in such a way that the target position of the structure comes to lie within an area that is detectable by the coordinate measuring instrument,

further characterized in that, by [[.]] using the CT scanner, a three-dimensional digital CT image of a tolerance volume, including the structure, is created and stored as a CT data record, and the actual position of the structure is determined in the CT coordinate system on the basis of the CT data record.

13. (previously presented)

A process for determining an actual position of a structure of an object to be examined (1) in a coordinate system, wherein a CT scanner is employed which uses CT technology, having a first coordinate system, the CT coordinate system, related to said CT scanner, and a coordinate measuring instrument is employed which is either a tactile or an optical coordinate measuring instrument, a multisensor coordinate measuring instrument, or an ultrasonic coordinate measuring instrument, having a second coordinate system, the MI coordinate system, related to said coordinate measuring instrument, wherein

a) coordinates of the object to be examined (1) are determined in the CT coordinate system,

b) a target position of the structure within the object to be examined (1) is predefined,

c) after execution of steps a) and b), the target position is determined in

the CT coordinate system,

d) and, using the determination of step c), the object to be examined (1) is positioned in such a way that the target position of the structure comes to lie within an area that is detectable by the coordinate measuring instrument,

further characterized in that

when a predefined target position of the structure is relative to at least three selected, non-co-linear points of the object to be examined (1), the object to be examined (1) is positioned using the CT scanner in such a way that at least a part of the object to be examined (1) lies within the area that is detectable by the coordinate measuring instrument and this part of the object to be examined (1) contains the target position of the structure; [[,]]

at a predefined maximum deviation of the target position from the actual position of the structure of the object to be examined (1), said object is positioned using the CT scanner in such a way that the target position as well as the actual position of the structure lie within the area that is detectable by the coordinate measuring instrument; [[,]] the actual position differs from the target position by a predefined tolerance deviation at most, so that the

actual position lies within a tolerance area whose edge is at a distance from the target position by the tolerance deviation at most; [[,]]

and the object to be examined (1) is positioned using the CT scanner in such a way that the tolerance area lies completely within the area that is detectable by the coordinate measuring instrument,

further characterized in that

(i) by means of the CT scanner, a location of the at least three selected points of the object to be examined (1) is determined relative to the CT coordinate system,

(ii) the target position of the structure relative to the CT coordinate system is calculated using the determined locations obtained in step (i)[[.]],

(iii) the target position of the structure is converted from the CT coordinate system to the MI coordinate system so that subsequently a location of the target position in the CT coordinate system is known,

(iv) the object to be examined (1) is positioned relative to the coordinate measuring instrument by means of a traveling mechanism (3), using the target position of the structure obtained by means of step (iii) with respect to the MI coordinate system, in such a way that a tolerance volume and thus

also the structure lie within the area that is detectable by the coordinate measuring instrument, and

(v) using the coordinate measuring instrument, a three-dimensional digital image of the tolerance area, including the structure, is created and stored as an MI data record, and the actual position of the structure is determined in the MI coordinate system on the basis of the MI data record.

14. (currently amended) A process for determining an actual position of a structure of an object to be examined (1) in a coordinate system, wherein a CT scanner is employed which uses CT technology, having a first coordinate system, the CT coordinate system, related to said CT scanner, and a coordinate measuring instrument (MI) is employed which is either a tactile or an optical coordinate measuring instrument, a multisensor coordinate measuring instrument, or an ultrasonic coordinate measuring instrument, having a second coordinate system, the MI coordinate system, related to said coordinate measuring instrument, wherein

a) coordinates of the object to be examined (1) are determined in the MI coordinate system,

b) a target position of the structure within the object to be examined (1) is predefined,

c) after execution of steps a) and b), the target position is determined in the MI coordinate system,

d) and, using the determination of step c), the object to be examined (1) is positioned in such a way that the target position of the structure comes to lie within a volume detected by the CT scanner,

further

characterized in that,

the CT [[.]] scanner used is one that has an X-ray source (5) and a two-dimensional, position-resolving detector (6) having an active detector surface that is sensitive to radiation emitted by the X-ray source (5), wherein an image field of the CT scanner is defined by the size of the active detector surface; [[,]]

the target position of the structure, relative to at least three selected, non-co-linear points of the object to be examined (1), is predefined, and the actual position differs from the target position by a tolerance deviation at most, so that the actual position lies within a tolerance volume whose edge is at a distance from the target position by the tolerance deviation at most; [[,]] and

a relative location and a relative orientation of the CT coordinate system relative to the MI coordinate system are known or are determined by means of calibration,

and wherein the following steps are carried out:

a) by means of the coordinate measuring instrument, locations of the at least three selected points of the object to be examined (1) are determined relative to the MI coordinate system,

b) the target position of the structure relative to the MI coordinate system is calculated using the determined locations obtained in step a),

c) the target position of the structure is converted from the MI coordinate system to the CT coordinate system, so that the location thereof in the CT coordinate system is known,

d) a relative position of the object to be examined (1) is regulated with respect to the CT scanner by means of a traveling mechanism (3), using the target position of the structure obtained by means of step c) relative to the CT coordinate system, in such a way that the tolerance volume and thus also the structure lie within the volume that is detectable by the CT scanner,

e) by means of the CT scanner, a three-dimensional digital CT image of the

tolerance volume, including the structure, is created and stored as a CT data record, and

f) the actual position of the structure is determined in the CT coordinate system on the basis of the CT data record.

15. (original) The process according to Claim 14, characterized in that the tolerance volume is a tolerance sphere, so that its radius is defined by the tolerance deviation and its mid-point is defined by the target position.

16. (currently amended) The process according to Claim 14 or 15,

characterized in that

[[-]]

the CT scanner in process step d) is regulated in such a way that a center of the tolerance volume is essentially located in a center of the volume that is detectable by the CT scanner.

17. (cancelled)

18. (previously presented) The process according to claim 16, characterized in that

the CT scanner is regulated in such a way that, with a centered projection of the tolerance volume with the X-ray source (5) as a center of projection,

the smallest diameter of the projection of the tolerance volume onto the detector and the smallest diameter of the image field of the CT scanner are essentially equal in size, or

the largest diameter of the projection of the tolerance volume onto the detector and the largest diameter of the image field of the CT scanner are essentially equal in size, or

the largest diameter of the projection of the tolerance volume onto the detector and the smallest diameter of the image field of the CT scanner are essentially equal in size.

19. (previously presented)

A process for determining an actual position of a structure of an object to be examined (1) in a coordinate system, wherein a CT scanner is employed which uses CT technology, having a first coordinate system, the CT coordinate system, related to said CT scanner, and a coordinate measuring instrument (MI) is employed which is either a tactile or an optical coordinate measuring instrument, a multisensor coordinate

measuring instrument, or an ultrasonic coordinate measuring instrument, having a second coordinate system, the MI coordinate system, related to said coordinate measuring instrument, wherein

a) coordinates of the object to be examined (1) are determined in the MI coordinate system,

b) a target position of the structure within the object to be examined (1) is predefined,

c) after execution of steps a) and b), the target position is determined in the MI coordinate system,

d) and, using the determination of step c), the object to be examined (1) is positioned in such a way that the target position of the structure comes to lie within a volume detected by the CT scanner,

further characterized in that,

in addition to the actual position of the structure, a shape of the structure is also determined on the basis of a CT image or a CT data record.

20. (currently amended)

A process for determining an actual position of a structure of an object to be examined (1) in a coordinate system, wherein a CT scanner is employed which uses CT technology, having a first coordinate system, the CT coordinate system, related to said CT

scanner, and a coordinate measuring instrument is employed which is either a tactile or an optical coordinate measuring instrument, a multisensor coordinate measuring instrument, or an ultrasonic coordinate measuring instrument, having a second coordinate system, the MI coordinate system, related to said coordinate measuring instrument, wherein

a) coordinates of the object to be examined (1) are determined in the CT coordinate system,

b) a target [[,]] position of the structure within the object to be examined (1) is predefined,

c) after execution of steps a) and b), the target position is determined in the CT coordinate system,

d) and, using the determination of step c), the object to be examined (1) is positioned in such a way that the target position of the structure comes to lie within an area that is detectable by the coordinate measuring instrument, further characterized in that

the shape of the structure is determined on the basis of a CT image or a CT data record.

21. (currently amended)

A process for determining an actual position of a structure of an object to be examined (1) in a coordinate system, wherein a CT scanner is employed which uses CT technology, having a first coordinate system, the CT coordinate system, related to said CT scanner, and a coordinate measuring instrument is employed which is either a tactile or an optical coordinate measuring instrument, a multisensor coordinate measuring instrument, or an ultrasonic coordinate measuring instrument, having a second coordinate system, the MI coordinate system, related to said coordinate measuring instrument, wherein

a) coordinates of the object to be examined (1) are determined in the CT coordinate system,

b) a target position of the structure within the object to be examined (1) is predefined,

c) after execution of steps a) and b), the target position is determined in the CT coordinate system,

d) and, using the determination of step c), the object to be examined (1) is positioned in such a way that the target position of the structure comes to lie within an area that is detectable by the coordinate measuring instrument,

further

characterized in that

a position of at least three selected space points of a calibration object is determined with the CT scanner in the CT coordinate system as well as with the coordinate measuring instrument in the MI coordinate system, and a comparison of results thus obtained ~~allows~~ is used to determine a relative location and a relative orientation of the CT coordinate system relative to the MI coordinate system.

22. (original) The process according to Claim 21, characterized in that the object to be examined (1) and the calibration object are identical.

23. (previously presented) The process according to claim 1 or 2, characterized in that,

A) the object to be examined (1) is rotated incrementally around an axis of rotation in order to create the CT image,

B) for each of a plurality of rotational positions that the object to be examined (1) thus passes through, a two-dimensional transmission X-ray image of the object to be examined (1) is taken with a detector (6), and

C) a three-dimensional CT image is created on the basis of the two-dimensional transmission X-ray images thus obtained.

24. (currently amended) The process according to Claim 23, characterized in that,

D) after steps A) and B) have been carried out, the object to be examined (1) is shifted translatorily by a certain distance, in a direction parallel to the axis [[,]] of rotation, and then once again rotated incrementally around the axis of rotation;

E) for each of a plurality of rotational positions that the object to be examined passes through in step D), a two-dimensional transmission X-ray image of the object to be examined (1) is once again taken with the detector

(6), and

F) another three-dimensional CT image is created on the basis of the two-dimensional transmission X-ray images obtained in step E).

Please cancel claims 25 through 39.

40. (previously presented) A process for determining an actual position of a structure of an object to be examined (1) in a coordinate system, wherein a CT scanner is employed which uses CT technology, having a first coordinate system, the CT coordinate system, related to said CT scanner, and a coordinate measuring instrument (MI) is employed which is either a tactile or an optical coordinate measuring instrument, a multisensor coordinate measuring instrument, or an ultrasonic coordinate measuring instrument, having a second coordinate system, the MI coordinate system, related to said coordinate measuring instrument, wherein

a) coordinates of the object to be examined (1) are determined in the MI coordinate system,

[[a)]] b) a target position of the structure within the object to be examined (1) is predefined,

[[b)]] c) after execution of steps a) and b), the target position is determined in the MI coordinate system,

[[c)]] d) and, using the determination of step c), the object to be examined (1) is

positioned in such a way that the target position of the structure comes to lie within a volume detected by the CT scanner,

further characterized in that

the shape of the structure is determined on the basis of a CT image or a CT data record.

41. (previously presented) A process for determining an actual position of a structure of an object to be examined (1) in a coordinate system, wherein a CT scanner is employed which uses CT technology, having a first coordinate system, the CT coordinate system, related to said CT scanner, and a coordinate measuring instrument (MI) is employed which is either a tactile or an optical coordinate measuring instrument, a multisensor coordinate measuring instrument, or an ultrasonic coordinate measuring instrument, having a second coordinate system, the [[ML]] MI coordinate system, related to said coordinate measuring instrument, wherein

a) coordinates of the object to be examined (1) are determined in the MI coordinate system,

b) a target position of the structure within the object to be examined (1) is predefined,

c) after execution of steps a) and b), the target position is determined in the MI coordinate system,

d) and, using the determination of step c), the object to be examined (1) is

positioned in such a way that the target position of the structure comes to lie within a volume detected by the CT scanner,

further characterized in that a position of at least three selected space points of a calibration object is determined with the CT scanner in the CT coordinate system as well as with the coordinate measuring instrument in the MI coordinate system, and comparison of results obtained ~~allows~~ is used to determine a relative location and a relative orientation of the CT coordinate system relative to the MI coordinate system.

42. (previously presented) The process according to Claim 41, characterized in that the object to be examined (1) and the calibration object are identical.

43. (cancelled)

44. (previously presented) The process according to Claim 40,

characterized in

that,

at a predefined maximum deviation of the target position from an actual position of the structure of the object to be examined (1), said object is positioned using the coordinate measuring instrument in such a way that the target position as well as the actual position of the structure lie within the volume detected by the CT scanner.

45, .(previously presented) The process according to Claim 19,

characterized in

that,

an actual position differs from the target position by a predefined tolerance deviation at most, so that the actual position lies within a tolerance volume whose edge is at a distance from the target position by a tolerance deviation at most, and

the object to be examined is positioned using the coordinate measuring instrument in such a way that a tolerance volume lies completely within a volume detected by the CT scanner.

46. (previously presented) The process according to Claim 1, characterized in that the tolerance volume is a sphere, a tolerance sphere, whose mid-point coincides with the

target position and whose radius is predefined by an amount of the maximum deviation of the target position from an actual position of the structure.

47. (previously presented) The process according to Claim 1, characterized in that the object to be examined is positioned using the coordinate measuring instrument in such a way that the volume detected by the CT scanner has, at most, an x-fold volume of the tolerance volume, wherein x is a predefinable number that is greater than 1.

48. (currently amended) The process according to Claim 19, characterized in that

> the CT [[.]] scanner used is one that has an X-ray source (5) and a two-dimensional, position-resolving detector (6) having an active detector surface that is sensitive to radiation emitted by the X-ray source (5), wherein an image field of the CT scanner is defined by a size of an active detector surface.

49. (previously presented) The process according to Claim 1, characterized in that the target position of the structure, relative to at least three selected, non-co-linear points of the object to be examined (1), is predefined, and an actual

position differs from the target position by a tolerance deviation at most, so that the actual position lies within a tolerance volume whose edge is at a distance from the target position by the tolerance deviation at most.

50. (previously presented) The process according to Claim 19, characterized in that a relative location and a relative orientation of the CT coordinate system relative to the MI coordinate system are known or are determined by means of calibration.

51. (currently amended) The process according to Claim 19, characterized in that locations of at least three selected points of the object to be examined (1) are determined relative to the MI coordinate system by means of the coordinate measuring instrument; and [[.]]

calculating the target position of the structure relative to the MI coordinate system using the determined locations obtained.

52. (currently amended) The process according to Claim 19, characterized in that the target position of the structure is converted from the MI coordinate system to the CT coordinate system, so that the location thereof in the CT coordinate system is

known. [[,]]

53. (previously presented) The process according to Claim 19, characterized in that a relative position of the object to be examined (1) is regulated with respect to the CT scanner by means of a traveling mechanism (3), using the target position of the structure, obtained by means of converting the target position of the structure from the MI coordinate system to the CT coordinate system, relative to the CT coordinate system, in such a way that the tolerance volume and thus also the structure lie within the volume that is detectable by the CT scanner.

54. (previously presented) The process according to Claim 19, characterized in that a three-dimensional digital CT image of the tolerance volume, including the structure, is created by means of the CT scanner and stored as a CT data record, and an actual position of the structure is determined in the CT coordinate system on the basis of the CT data record.

55. (previously presented) The process according to Claim 1, characterized in that

the CT scanner is regulated in such a way that a center of the tolerance volume is essentially located in a center of the volume that is detectable by the CT scanner.

56. (previously presented) The process according to Claim 1, characterized in that when a predefined target position of the structure is relative to at least three selected, non-co-linear points of the object to be examined (1), the object to be examined (1) is positioned using the CT scanner in such a way that at least a part of the object to be examined (1) lies within the area that is detectable by the coordinate measuring instrument and this part of the object to be examined (1) contains the target position of the structure.

57. (previously presented) The process according to Claim 20, characterized in that at a predefined maximum deviation of the target position from an actual position of the structure of the object to be examined (1), said object is positioned using the CT scanner in such a way that the target position as well as the actual position of the structure lie within the area that is detectable by the coordinate measuring instrument.

58. (previously presented) The process according to Claim 20, characterized in that

an actual position differs from the target position by a predefined tolerance deviation at most, so that the actual position lies within a tolerance area whose edge is at a distance from the target position by the tolerance deviation at most, and

the object to be examined (1) is positioned using the CT scanner in such a way that the tolerance area lies completely within the area that is detectable by the coordinate measuring instrument.

59. (previously presented) The process according to Claim 20, characterized in

that the object to be examined (1) is positioned relative to the coordinate measuring instrument by means of a traveling mechanism (3), using the target position of the structure, obtained by means of converting the target position from the CT coordinate system to the MI coordinate system, with respect to the MI coordinate system, in such a way that a tolerance volume and thus also the structure lie within an area that is detectable by the coordinate measuring instrument.